

In the Claims:

Please amend the Claims as follows:

1. (Canceled)

2. (Currently Amended) ~~A method as defined in Claim 1-A method for brightness and contrast normalization in appearance-based object detection, the method comprising:~~

extracting a plurality of training images;

finding eigenimages corresponding to the training images;

receiving an input image;

forming a projection equation responsive to the eigenimages by adding a scaling and a shift to image intensity and simultaneously solving for intensity normalization parameters;

computing projected and normalized images;

computing an error-of-fit of the projected and normalized images;

thresholding the error-of-fit; and

determining object positions in accordance with the thresholded error-of-fit,

wherein finding eigenimages comprises:

sub-sampling the training images;

forming training images of coarse resolution in accordance with the sub-sampled images;

computing eigenimages corresponding to the training images of coarse resolution;

interpolating the eigenimages for coarse resolution;

performing orthonormalization on the interpolated images by singular value decomposition; and

providing pseudo-eigenimages corresponding to the orthonormalized images for a finer resolution.

3. (Currently Amended) A method as defined in Claim 1 Claim 2 wherein at least one of said plurality of training images and said input image comprises a single-photon emission computed tomography image.

4. (Currently Amended) A method as defined in Claim 1 Claim 2 wherein the computed error-of-fit is represented by a score image.

5. (Currently Amended) A method as defined in Claim 1 A method for brightness and contrast normalization in appearance-based object detection, the method comprising:

extracting a plurality of training images;

finding eigenimages corresponding to the training images;

receiving an input image;  
forming a projection equation responsive to the eigenimages by adding a  
scaling and a shift to image intensity and simultaneously solving for intensity  
normalization parameters;  
computing projected and normalized images;  
computing an error-of-fit of the projected and normalized images;  
thresholding the error-of-fit; and  
determining object positions in accordance with the thresholded error-of-  
fit,  
further comprising forming eigenimages for multiresolution, including:  
    sub-sampling a plurality of training images;  
    forming training images of coarse resolution in accordance with the  
    sub-sampled images;  
    computing coarse eigenimages corresponding to the training  
    images of coarse resolution;  
    interpolating the coarse eigenimages for a finer resolution;  
    orthonormalizing the interpolated images; and  
    providing pseudo-eigenimages corresponding to the  
    orthonormalized images for a finer resolution,  
    wherein the pseudo-eigenimages are formed with a projection  
    equation responsive to the coarse eigenimages by adding a scaling and a  
    shift to image intensity.

6. (Original) A method as defined in Claim 5 wherein orthonormalizing the interpolated images comprises performing a singular value decomposition.

7-12. (Canceled)

13. (Currently Amended) ~~A system as defined in Claim 12~~ A system for brightness and contrast normalization in appearance-based object detection, the system comprising:

extraction means for extracting a plurality of training images;  
finding means for finding eigenimages corresponding to the training images;  
receiving means for receiving an input image;  
forming/solving means for forming a projection equation responsive to the eigenimages by adding a scaling and a shift to image intensity and simultaneously solving for intensity normalization parameters;  
computing means for computing projected and normalized images;  
fitting means for computing an error-of-fit of the projected and normalized images;  
thresholding means for thresholding the error-of-fit; and  
determining means for determining object positions in accordance with the thresholded error-of-fit,

wherein said finding means comprises:

sub-sampling means for sub-sampling the training images;

training means for forming training images of coarse resolution in

accordance with the sub-sampled images;

eigenimaging means for computing eigenimages corresponding to

the training images of coarse resolution;

interpolating means for interpolating the eigenimages for coarse

resolution;

orthonormalization means for performing orthonormalization on the

interpolated images by singular value decomposition; and

pseudo-eigenimaging means for providing pseudo-eigenimages

corresponding to the orthonormalized images for a finer resolution.

14. (Currently Amended) A system as defined in Claim 12 Claim 13

wherein at least one of said plurality of training images and said input image

comprises a single-photon emission computed tomography image.

15. (Currently Amended) A system as defined in Claim 12 Claim 13

wherein the computed error-of-fit is represented by a score image.

16. (Currently Amended) A system as defined in Claim 12, further

comprising A system for brightness and contrast normalization in appearance-

based object detection, the system comprising:

extraction means for extracting a plurality of training images;

finding means for finding eigenimages corresponding to the training images;

receiving means for receiving an input image;

forming/solving means for forming a projection equation responsive to the eigenimages by adding a scaling and a shift to image intensity and simultaneously solving for intensity normalization parameters;

computing means for computing projected and normalized images;

fitting means for computing an error-of-fit of the projected and normalized images;

thresholding means for thresholding the error-of-fit; and

determining means for determining object positions in accordance with the thresholded error-of-fit;

means for forming eigenimages for multiresolution, including:

sub-sampling means for sub-sampling a plurality of training images;

training means for forming training images of coarse resolution in accordance with the sub-sampled images;

eigenimaging means for computing coarse eigenimages

corresponding to the training images of coarse resolution;

interpolating means for interpolating the coarse eigenimages for a finer resolution;

orthonormalizing means for orthonormalizing the interpolated images; and

pseudo-eigenimaging means for providing pseudo-eigenimages corresponding to the orthonormalized images for a finer resolution, wherein the pseudo-eigenimages are formed with a projection equation responsive to the coarse eigenimages by adding a scaling and a shift to image intensity.

17. (Original) A system as defined in Claim 16 wherein said orthonormalizing means comprises decomposition means for performing a singular value decomposition.

18. (Canceled)

19. (Currently Amended) A program storage device as defined in Claim 18  
A program storage device readable by machine, tangibly embodying a program  
of instructions executable by the machine to perform method steps for brightness  
and contrast normalization in appearance-based object detection, the method  
steps comprising:

extracting a plurality of training images;

finding eigenimages corresponding to the training images;

receiving an input image;

forming a projection equation responsive to the eigenimages by adding a scaling and a shift to image intensity and simultaneously solving for intensity normalization parameters;

computing projected and normalized images;

computing an error-of-fit of the projected and normalized images;

thresholding the error-of-fit; and

determining object positions in accordance with the thresholded error-of-fit,

wherein the program step of finding eigenimages comprises:

sub-sampling the training images;

forming training images of coarse resolution in accordance with the sub-sampled images;

computing eigenimages corresponding to the training images of coarse resolution;

interpolating the eigenimages for coarse resolution;

performing orthonormalization on the interpolated images by singular value decomposition; and

providing pseudo-eigenimages corresponding to the orthonormalized images for a finer resolution.

20. (Currently Amended) A program storage device as defined in ~~Claim 18~~  
Claim 19 wherein at least one of said plurality of training images and said input

image comprises a single-photon emission computed tomography image.

21. (Currently Amended) A program storage device as defined in ~~Claim 18~~  
Claim 19 wherein the computed error-of-fit is represented by a score image.

22. (Currently Amended) ~~A program storage device as defined in Claim 18,~~ A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for brightness and contrast normalization in appearance-based object detection, the method steps comprising:

extracting a plurality of training images;  
finding eigenimages corresponding to the training images;  
receiving an input image;  
forming a projection equation responsive to the eigenimages by adding a scaling and a shift to image intensity and simultaneously solving for intensity normalization parameters;  
computing projected and normalized images;  
computing an error-of-fit of the projected and normalized images;  
thresholding the error-of-fit; and  
determining object positions in accordance with the thresholded error-of-fit,  
further comprising method steps for forming eigenimages for

multiresolution, including:

- sub-sampling a plurality of training images;
- forming training images of coarse resolution in accordance with the sub-sampled images;
- computing coarse eigenimages corresponding to the training images of coarse resolution;
- interpolating the coarse eigenimages for a finer resolution;
- orthonormalizing the interpolated images; and
- providing pseudo-eigenimages corresponding to the orthonormalized images for a finer resolution,  
wherein the pseudo-eigenimages are formed with a projection equation responsive to the coarse eigenimages by adding a scaling and a shift to image intensity.

23. (Original) A program storage device as defined in Claim 22 wherein the program step of orthonormalizing the interpolated images comprises performing a singular value decomposition.